4) **In the second simulation**, you will prefer to eat the gold fish (these fish taste yummy and are easy to catch) you will eat ONLY gold fish unless none are available in which case you resort to eating brown fish in order to stay alive (the brown fish taste salty, are sneaky and hard to catch).

5) New fish are born every "year"; the birth rate equals the death rate. You simulate births by reaching into the pool of "spare fish" and selecting randomly.

6) Since the gold trait is recessive, the gold fish are homozygous recessive (ff). Because the brown trait is dominant, the brown fish are either homozygous or heterozygous dominant (FF or Ff).

Hardy-Weinberg:

G. H. Hardy, an English mathematician, and W.R. Weinberg, a German physician, independently worked out the effects of random mating in successive generations on the frequencies of alleles in a population. This is important for biologists because it is the basis of hypothetical stability from which real change can be measured. This also allows you to figure out the frequency of genotypes from phenotypes.

You assume that in the total population of fish crackers, you have the following genotypes, FF, Ff, and ff. You also assume that mating is random so that ff could mate with ff, Ff, or FF; or Ff could mate with ff, Ff, or FF, etc. In addition, you assume that for the gold and brown traits there are only two alleles in the population - F and f. If you counted all the alleles for these traits, the fraction of "f" alleles plus the fraction of "F" alleles would add up to 1.

The Hardy-Weinberg equation states that: $p2 + 2pq + q2 = 1$

This means that the fraction of pp (or FF) individuals plus the fraction of pq (or Ff) individuals plus the fraction of qq (ff) individuals equals 1. The pq is multiplied by 2 because there are two ways to get that combination. You can get "F" from the male and "f" from the female OR "f" from the male and "F" from female.

If you know that you have 16% recessive fish (ff), then your qq or q2 value is .16 and q = the square root of .16 or .4; thus the frequency of your f allele is .4 and since the sum of